ENTERPRISE DEVELOPMENT AND MARKET COMPETITIVENESS (EDMC)

Android and iPhone Application Development Training

ENTERPRISE DEVELOPMENT AND MARKET COMPETITIVENESS PROJECT

ANDROID AND IPHONE APPLICATION DEVELOPMENT TRAINING
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USAID COTR: Diana Avetyan
Acting Chief of Party: Gayane Dallakyan

Developed by: Hugo H. Pibernat

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1. Introduction

This report summarises the USAID Gyumri on-site cooperation action between September 24th and October 14th. The purpose of the project was to provide future trainers training about mobile applications development. Although the main goal of the training was to improve their technical skills, it was also crucial to provide these future trainers with some communication and evaluation skills. The results were quite promising. Among the participants, an appropiate candidate for future trainings was detected, and other two students might be well prepared with some additional help. At the end of the training, according to the goals accomplishment level, there were two different certificates produced. The first one, completion certificate, was provided to four students. The other eight participants were provided with participation certificates.

1.1. Scope

GITC is a non-profit, scientific and educational foundation providing post-graduate ICT work force training. The GITC is located in the Shirak Marz, in Gyumri, which is the second largest city in Armenia. It trains highly-qualified individuals helping to develop the information technology sector in Gyumri, introducing advanced learning methodologies, and creating jobs. The GITC has a current annual enrollment of approximately 50 students for two programs: software engineering, focusing on web development, and mobile technologies, which includes iPhone iOS and Android technologies and project management topics.

Due to the limited supply of local qualified personnel, GITC currently recruits a vast majority of its instructors from Yerevan, paying for transportation and lodging costs in addition to salary. The GITC must, therefore, provide either full-time employment or incur the inefficiency and overhead of part-time staffing.

The project aims to develop modern curriculums for GITC and build capacity of a select group of GITC faculty to provide high class education and trainings contributing to the increased competitiveness of the IT sector. The proposed consultant will work with GITC to review the center's training programs and the workforce skills demand in the mobile technologies (iPhone/Android) market and based on that will develop the training curriculums. Training of trainers for the newly curriculum will be conducted by the STTA for GITC's faculty, students, and local IT specialists.

1.2. Objective

The "Training of Trainers and Curriculum Development in Mobile Technologies – Android and iPhones" project's overall objective is to assure sustainability of Gyumri IT Center (GITC) and to introduce new educational services via preparation of local qualified instructors.

The objective is to help Armenia develop a high skilled and competitive workforce for the IT sector. The EDMC Project will field a technology specialist that will aid Gyumri IT Center (GITC) in:

a) Develop curriculums for iPhone and android mobile technologies for GITC's newly established mobile technologies faculty.

b) Implement trainings of a core group of local, qualified, full-time instructors (up to 15 trainees) in Mobile Technologies – Android and iPhone.

Within the scope of the project EDMC is also planning to assist GITC with capacity building providing necessary equipment for effective implementation of the mobile trainings. The equipment will be used by GITC's mobile technologies faculty in their future trainings.

2.   Implementation

The training had two areas of study clearly differentiated. The first one, the subject of which was the Android framework, was divided in ten lessons; whereas the second one, related to iOS, was divided in six. Each lesson had a four hours-length format. Time was distributed with a theory:practice ratio of 1:4.

2.1.   Android Training

After assessing the level of knowledge of the students, the consultant realized they already had the grounds of the subject thanks to some previous experience. As a consequence, the consultant decided to increase the level of the training and start by reviewing the foundations of the Android core components. It started with the operating system fundamentals and, later on, the most common functionalities of Android's and Google's SDKs were studied in depth. The complete agenda covered the following lessons:

1. Introduction to Android & Widgets
2. The Application Class
3. Activity Lifecycle
4. Fragments
5. Consuming REST Web Services
6. Layouts
7. Resources & Styles
8. Intents & Navigational Widgets
9. Playing with a WebView
10. Playing with Maps

2.2.   iOS Training

The iOS training was divided into six sessions. The main reason to be a shorter length training than the previous one was the number of students interested in Android was much higher than those interested in iOS. Besides, iOS works at a higher level of abstraction, generally speaking. As a result, the methods in the library are relatively userfriendly. Therefore, the OS behaviour and the insights of the Coca library can be explained by means of examples; whereas in Android, normally, it is necessary to explain first the theory and then practice with examples. The complete agenda covered the following lessons:

1. Introduction to iOS, Xcode & InterfaceBuilder
2. Cocoa & Table Views
3. 2D Animations
4. Tab Bar, Navigation Bar & 3D Animations
5. CoverFlow (Delegate, DataSource)
6. CoreData (UIApplication, AppDelegate)

2.3.   Exercises and Evaluation

The exercises proposed had a double finality. First, the consultant had to assess continuously that the key concepts of each lesson were correctly understood by the attendees. Second, the consultant wanted to introduce different types of exercises to enhance the creativity of future trainers when designing their own evaluation methods and exercises.

In order to complete the training, students had to proof the skills necessary to understand the foundations of the Android/iOS operating systems and their respective SDKs. However, they were also asked to give a lesson, in order to check their communication skills and their ability to lead a group of students. Due to the short length of the training, the certificates of completion were given to all those students that showed the technical and theoretical skills demanded. Moreover, all the students had to prepare their own lecture with an approximate length of 30 minutes plus the related supporting materials. These lectures were used to explain to the future trainers the common mistakes that may result in very unsuccessful lessons, but also to make them realise that it is essential for their development as trainers to improve their communication skills.

2.4.   Document Structure

In the rest of this document we will first review the results of the action. Next, we will propose some possible challenges for the future of the project. Later, in Annex A we will provide a description of the most suitable candidates for training at GITC. Next, in Annex B reviews some organization proposals that may improve future similar trainings. Annex C contains a list of three compimentary pdf documents that should be attached to this report. The first one contains the attendance of each candidate to the training, the second one contains the training curricula for Android, and the third one contains the training curricula for iOS.

3.   Results

The following goals/deliverables have been accomplished by the consultant (Hugo H. Pibernat):

1. Successfully implemented training for Android and iOS development.

2. Recognized, assess and recommend one very suitable candidate for providing further trainings and two additional qualified candidates.

3. Provided invited seminar at DigiTech Expo 2012 (explanation at the end of this section).

4. Developed training curricula for Android and iOS development to be used at GITC.

3.1. Seminar at DigiTech Expo 2012

The consultant was invited to give a speech at the DigiTech Expo 2012. The title of the speech was *Become a Pro!*[1]. It was addressed to graduate students with experience in mobile application development. Due to a suggestion from the organizational board we focused it primarily in the game market. We reviewed the common techniques and knowledge used by most successful social/mobile gaming developers in the world. It is the opinion of the speaker that the speech was quite successful, lasting almost two hours with forty additional minutes to review real cases and answer questions.

Moreover, and for the records of USAID, the consultant would like to briefly explain his thoughts about the exhibition and the seminar attendees. First of all, compared to other international fairs, it was impressive, the exhibitors attending were both local entities and international companies. This fair was also a launch for new Armenian ideas and projects giving a good symptom of the Armenian IT field health. Some of the projects presented could compete with American or European counterparts, provided they found their way to become popular worldwide. The consultant is really curious about the Armenian IT professionals expertise in marketing and enterprise communications. The consultant also wonders if there is any national agency or institute to help with the internationalization of companies. If there is not, a modern communication agency could have a great impact in the business field, even for cities as Gyumri. Digital communication allows to shorten distances between service providers and consumers, and that could help a lot to reallocating some start-ups to Gyumri were accommodation, offices and services are much cheaper.

Before the speech, some of the attendees showed their applications to the speaker. Most of them were games, and at least two of them could be hits. However, again the lack of interested business board supporting these freelance developers results in projects disappearance. One of these games had above half a million downloads, that is far more than the needed to make a living out of a game. But the lack of analytics knowledge and business perspective, prevents freelance developers from understanding and following in a daily basis the behaviour and profitability of the application.

To conclude, it is quite clear that Armenia has all the ingredients needed to seed new gaming companies, especially for the mobile's field which is currently a huge trend in international markets with revenues of not less than 50% year after year and still increasing. The consultant is not an expert in the Armenian business culture and does not know the profiles of any very successful entrepreneur there. However, it is his opinion that if the best of these initiatives were provided with proper development environment, adequate space and daily experts advise and training, they could become huge companies that might boost the Armenian economy and create easily around a hundred new job positions in three or four years[2].

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1   Slides available at http://www.slideshare.net/hugopibernat/digitec-2012-14620839

2   Numbers based on the average size of mid-size gaming studios around the world.

4.   Challenges

In this section the consultant gives his personal opinion about which are the circumstances that prevent the proper IT industry development in Gyumri. The recommendations summarize two different trainings that may potentially help GITC graduates to improve their ability and desire to collaborate. The consultant also wants to remark his predisposition towards giving this trainings although there are many different professionals that could do this same task.

1. **Communication skills development.** Already in the first two days of the training, the consultant realized that some of the attendees had a very good technical background. However, the training was partially oriented to help them to develop applications in a much more consistent manner, observing thoroughly the different issues that may appear during the execution of such applications. Among these issues there are: scarce memory situations, orientation changes, or handling of untimely events. Unfortunately, these highly developed technical skills come at the price of poorly developed communication skills, such as, difficulties for asking questions in public, for explaining the work done by themselves, for preparing presentations, for organizing ideas in a comprehensive manner for different audiences, and so on. Therefore, the consultant highly recommends EDMC and USAID to provide with further trainings to this same group of students. Such trainings could probably be shorter, maybe just two weeks. In the first week, they should review the general presentation skills applied to non-technical fields and make some practices. In the second, students should be encouraged to introduce some project they have developed in the present or past. It should be advisable to ask them to do at least three times the same presentation in the same week for later analyze the performance differences. Video recording is highly recommended. Communication is essential for all facets of professional and academical life: Students, Lecturers, Engineers, Project Managers or General Managers, they all need good communication capabilities in a daily basis.

2. **Team building activities.** The difficulties of attendees to work in groups and collaborate were notorious. Even students themselves agreed on that very specific and important problem. Team building has usually been appointed as a matter of attitude and therefore there is not much knowledge that a trainer can provide. Fortunately, there exist many different activities that can be performed to improve these skills. From simple friendly exercises to reduce shyness to more complicated competitions where the attendees are divided in two groups and only those who collaborate are able to win. This kind of exercises are generally used as a metaphor of the real competitive business environments. Team building might not be that important for their academic curricula, but it plays a key role in business development initiatives.

A.   Detailed Candidate Profiles

The trainings for trainers on mobile development held from September 24th to October 13th have been quite successful. However, the aim of this appendix is to focus on the achievements of three specific candidates: Seda Sargsyan, Anahit Gharakeshishyan and Naira Gevorkyan. The first two attended the Android training and the third the iOS training. The other attendants can also be considered as trainers, as they have the ability to develop the required skills, however they still have to acquire a deeper technical knowledge about mobile development before providing trainings for other students.

A.1. Seda Sargsyan

As most students, Seda attended only one of the two trainings. She chose the Android training due to previous experience with the platform. She proved a sound technical background which allowed her to understand complex problems and related issues. This knowledge is not only limited to the field of mobile development but also to other related areas as, for example, web technologies and information security. She is also proficient in the related theory. This means that she not only understands the basics of computing and mathematics behind them, but also the fundamentals of operating systems design, networking and essential hardware design.

As commented above, all students in the group suffer from the very usual underdeveloped skills of technical professionals. Among these, the difficulty to communicate with colleagues, a zero-ability for team building, a very low capacity to synthesize, and a very low experience in presenting ideas can be highlighted.

However, among the group members who participated in the evaluation process. Seda showed the highest combination of interest in creating comprehensive materials for aiding ideas, communication and also a sense to understand that the presentation's goal is to give something to the audience. It is the opinion of this consultant, that she (and some other participants) could dramatically improve their communication skills if such training was provided. A nontechnical scope training may allow them to realize the importance of investing huge amounts of time in the preparation of support materials, exercises, speeches and, also, in improving organization. Learning the fundamental emphatically tells and tricks that allow to grasp and maintain the attention of audiences for long periods of time may also play a key role in becoming a successful trainer and communicatior.

Anyway, Seda is already prepared to provide training to other students in the field of Android development as a considerable amount of time during the training has been invested in providing a deep knowledge of core Android. Therefore, she should be able to not only explain the usual contents of an undergraduate training, but also, with some additional practice, she should be ready to lecture postgraduate students.

It must be taken into account that a good training is quite an arduous and exhausting task, even more at the beginning. This means that although Seda has enough skills to provide training, it is again the recommendation of this consultant to provide her with enough paid working hours to prepare lessons comfortably. At university level, generally it takes around two-three hours preparation per hour-lesson given for the first time, and around one hour per hour given for repeated lessons. Taking into account the amount of time needed for structuring ideas, preparing

speeches, creating support materials, design constructive exercises and define evaluation methods and goals.

Finally, it is the opinion of the consultant that Seda Sargsyan is the best prepared candidate for training at a university level that has attended the mobile development training. She has not only the technical level necessary, but also the willingness to be a good communicator. Although additional non-technical trainings could help her, she is already ready to prepare lessons and materials herself. Probably she lacks the experience needed to define the curricula for such trainings, but such a document will be provided by this consultant as a deliverable of the current project. And again, It has to be taken into account that, although the candidate trainer previous achievements, it is necessary to provide the candidate with enough time to prepare the lectures that she might be in charge of.

A.2. Anahit Gharakeshishyan

Anahit also attended the Android training. Her profile responds to the classical techie. She has a very deep understanding of most technologies and was highly interested not only in learning how to develop better applications but also in the working of the Android system as a whole. However, Anahit showed no interest at all about being a good communicator. She is technically rock-solid but needs additional training to develop some other skills before being able to successfully train undergraduates. Without a minimum effort in communication it is even quite difficult to provide fair evaluation methods and, right now, that would be difficult for her.

However, I would like to repeat that her level of technical proficiency is remarkable. She is someone who is willing to work and to face interesting challenges. As with most intelligent people it is sometimes difficult to show them that there are other ways of doing things that the one they first decided but it is also true that she is able to find proper solutions even in short periods of time.

My opinion is that these gap competences will prevent her from achieving full professional development. Even in the technology field, everyday is much more important to be able to communicate ideas at ease. Besides, not being able to explain what one has done is also a critical barrier for team-building, which has been pointed out as one of the main obstacles to prevent from foster business development in the region.

A.3. Naira Gevorkyan

Naira was one of the two people who attended both trainings, however she developed most exercises using iOS[3]. Moreover, she participated in most open debates during both trainings. She is highly communicative and has enough technical skills. Therefore, with some more months of experience she will be ready to provide training at undergraduate level. However, she lacks the deep technical background to train postgraduate students.

Focusing on undergraduate teaching, she is able to understand the main ideas of iOS development and has been able to solve most of the exercises and problems on her own. Nevertheless, she lacks the experience necessary to be self-confident about the topic, but that is just a matter of time. In her case, it would be very interesting to provide her with some additional exercises and problems to be solved, maybe during the next 3 to 4 months.

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3   Although exercises were designed for Android, she found similar solutions for iOS.

Even though she is able to communicate fluently (also in English), she lacks the know-how necessary to prepare a presentation. Likewise the rest of her classmates, she did not invest enough time preparing her presentation and as a result it became impossible for her to transmit how much she knew about the topic she was introducing.

B.   Organization Upgrade Proposals

Find below a list of facts that might help to upgrade the organization of this kind of seminars in the future. Although the events listed below did not have as a result any break down, the consultant is on the opinion that they should be taken into account when organizing this type of trainings in the future.

1. If the level, qualifications, previous background and interests of the attendees is not uniform, it might be interesting to conduct trainings for different levels.

2. The interests and expectations of the attendees should also be known. It should be stated on the training proposal that it will be a highly intense training and that the students may be required a commitment outside the classroom to perform homework additional to the teaching time. In the current training, the four hours a day, six days per week was too much for most of the students, as they also had additional professional duties. As a result, attendees hardly could carry out with their total homework.

3. The total amount of time invested on a preparation of a seminar for future trainers is much higher than in a usual seminar on a specific subject. The reason of this is that as the goal of the seminar is to be ready to teach when it ends. Therefore, students have to focus on their technical skills but also on the evaluation of specific areas, as well as on the creation of solvable exercises, among other important training skills. Moreover, attendees must reach not only a proficiency level that allows them to create applications but a field picture broad enough to respond to the general questions that can be put by their own students. This again meant a lot of time invested by the trainer and a lot of dedication from the students.

4. Good practices recommend between one and three hours of preparation per each hour of lecturing specially the first time that a training of this characteristics is given. As the time invested in creating materials, designing exercises and preparing speeches has a dramatic impact on the course success. On average, the consultant has needed between 8 and 10 working hours per day, including Sundays -which were considered non-working days.

5. Although the consultant did not think in advance that to give a training on two different platforms in the same training would be a problem, it has resulted confusing to the attendees. For future trainings it is advisable to be more clear with students about the fact that only one platform will be used at a time. The timing of the two platforms should be scheduled in advance, and the trainings could be scheduled one after the other so as to reduce transportation and lodging preparations in order to take the most of it. In essence, the recommendation is to be clear about the fact that there are two different trainings, and that certificates for both of them are different. This way students would have a clear idea to which seminar they are attending to. In particular, at this training it was difficult to decide when to stop with one platform and start with the other. Furthermore, although it is reasonable to schedule in advance, it is a good practice to review the agenda every three lessons, depending on the speed at which students reach the proposed goals. This practice helps the trainer maximize the knowledge and expertise provided to the students and also helps adjusting contents to students' needs.

C.   Complimentary Documents

1. Candidate attendance
2. Android Training Curriculum
3. iOS Training Curriculum